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A NEW CRAB, *SEORSUS WADEI,* FROM THE LATE CRETACEOUS COON CREEK FORMATION, UNION COUNTY, MISSISSIPPI

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Abstract.—A fossil dakoticancroid crab, *Seorsus wadei,* new genus and species, is described from the early Maastrichtian Coon Creek Formation of Union County, Mississippi. This crab belongs to the *Dakoticancer* Assemblage previously described from the Blue Springs locality. The only known specimens consist of a nearly complete, crushed, carapace steinkern and a partial carapace steinkern. *Seorsus* differs from other members of the Dakoticancridae in carapace proportions, shape and ornamentation.

Collection of the Blue Springs locality (Bishop 1983) on 10 Mar 1984, resulted in the discovery of a new fossil crab. The Blue Springs locality is situated geographically in the Mississippi Embayment, an ancient arm of the Cretaceous Tethys Seaway that occupied much of present Mississippi, Alabama, and western Tennessee. Two specimens were collected from the sandy claystone shelf sediments of the Coon Creek Formation of early Maastrichtian Age (Russell et al. 1983). Correlation with other North American Cretaceous rocks indicates an absolute age of approximately 67 million years before present. Both specimens are internal casts of the carapace and are preserved as steinkerns.

Systematic Paleontology

Order Decapoda Latreille, 1803
Superfamily Dakoticancroidea Rathbun, 1917
Family Dakoticancridae Rathbun, 1917

Seorsus, new genus

Type species.—The type species of *Seorsus* is *Seorsus wadei,* n. sp.

Diagnosis.—Carapace of moderate size, longer than wide (L/W = 1.10), widest at anterior ⅓; lateral margins distinctively convergent posteriorly; grooves broad, moderately defined; areolations very tumid, especially epibranchial lobes; cardiac region with small central tubercle; metabranchial region with subtle transverse and submarginal ridges. Claws and legs unknown.

Etymology.—"Seorsus" is derived from the Latin; apart, separate, severed, to indicate the carapace shape which sets this taxon apart from the other dakoticancroid genera and also the fragmented or severed nature of both specimens. The gender is masculine.

Occurrence.—*Seorsus* is known from a single species based on two carapace specimens from the Coon Creek Formation, early Maastrichtian, of Union County, Mississippi.

Seorsus wadei, new species
Fig. 1A–F

Diagnosis.—Carapace longer than wide (L/W = 1.10), widest at anterior ⅓; lateral margins distinctively convergent posteriorly. Grooves and areolations similar to those in other members of family. Carapace evenly granulate.

Description.—Carapace 1.10 times longer (23.3 mm) than wide (21.1 mm), widest at anterior ⅓; front relatively straight; anterolateral margin broadly rounded; lateral margins relatively straight, converging poste-

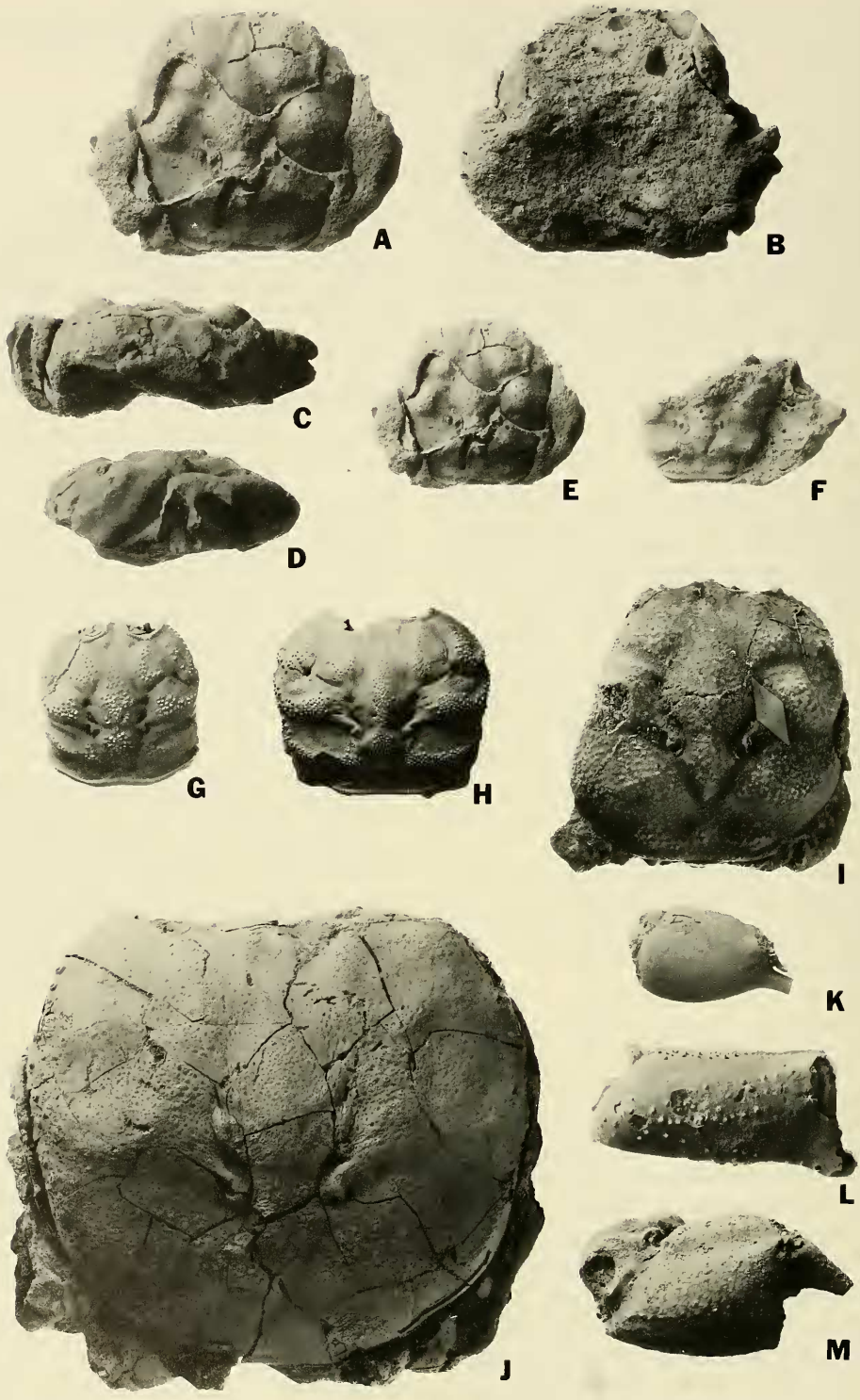
riorly; posterolateral margins tightly rounded; hind margin straight. Carapace regions tumid but poorly differentiated because of broad shallow grooves. Cervical groove sinuous, posteriorly reflexed around large mesogastric region; hepatic groove and longitudinal gastric grooves poorly defined but present; branchiocardiac and cervical grooves define epimeral peninsula; anterior branchial groove very shallow; posterior marginal groove sharply defined. Cephalic arch differentiated into large mesobranchial, intermediate protogastric, and small hepatic regions each raised into a granulate tumid areolation. Scapular arch differentiated into sagittal ridge consisting of cardiac and intestinal regions; and branchial regions consisting of raised epibranchial ridge, a smaller mesobranchial ridge, and metabranchial area. Cardiac region with low medial boss. Hind margin raised into a posterior rim. Transverse, low submarginal bosses on posterior of metabranchial regions. Orbits large and broad occupying 48% of carapace width. Carapace regions evenly granulated except for more coarsely granulated highest parts of hepatic and epibranchial regions. Legs very granulate, decreasing in size posteriorly, P_5 very small. Sternum and abdomen poorly exposed. Abdomen narrow (male) and abdominal somite A_1 with longitudinal ridge and transverse ridge.

Comparison.—*Seorsus wadei* is an enigmatic fossil. As with many fossil crabs represented by unique or only a few specimens, diagnostic characteristics necessary to confidently assign the species or genus to a higher taxonomic unit are often lacking. Assignment in such cases can only be made on the basis of circumstantial evidence such as general similarities in carapace shape, carapace morphology, and carapace ornamentation. Although admittedly not the best possible criteria, assignment to a family seems better than to such taxa as "Family Indeterminate," or not describing them at all. Once such a taxon is described it is available for scientific discussion and possible reassignment as other carcinologists evaluate the data.

Seorsus wadei has a generalized carapace lacking clearly definitive characteristics. Based solely on shape, *Seorsus* is most similar to trapezohedral members of the Family Geryonidae but differs from them by lacking the dentate front and the large orbits. *Seorsus* also resembles some members of the Family Goneplacidae in its trapezohedral shape but differs from them in having clearly divided orbits. The carapace areolation of *Seorsus* resembles closely that of members of the Family Dakoticancridae. If *Seorsus* is viewed obliquely from the front, this similarity is enhanced and the trapezohedral carapace outline becomes quite similar to that of *Dakoticancer* Rathbun, 1917. The carapace ornamentation of *Seorsus wadei* consists of low, intermittent granulation similar to that of *Dakoticancer, Avitelmessus* Rathbun, 1923, and *Tetracarcinus* Weller, 1905, 1907. Because of these similarities, *Seorsus* is assigned to the Family Dakoticancridae.

Seorsus wadei differs from other dakoticancroid crabs by its trapezohedral shape. *Seorsus wadei* is more arched and much smaller than *Avitelmessus grapsoideus* Rathbun, 1923, but larger than *Tetracarcinus subquadratus* Weller, 1905, and trapezohedral rather than quadrate. *Seorsus wadei* most resembles *Dakoticancer* in areolation and ornamentation. *Seorsus wadei* is trapezohedral whereas *D. australis* Rathbun, 1935, is nearly rectangular. *Seorsus wadei* is most similar to *D. overanus* Rathbun, 1917, which is slightly trapezohedral in carapace outline, but differs by being much more trapezohedral, having a relatively larger cephalic arch, and nearly lacking the prominent epimeral peninsulas of *D. overanus.*

Variation.—Because this species is represented by only two specimens, variation is undefinable. The mode of preservation as a steinkern preserves basic body shape and,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because of compression of the exterior mold onto the interior mold, some of the carapace ornamentation. Description of a new species based on two specimens is justified by sampling (a collection of about 1500 fossil decapods) which indicates that this species is such a minor taxon in the Blue Springs *Dakoticancer* Assemblage that additional specimens may not be collected for some time. Such low abundances in fossil and recent assemblages necessitate the description of new taxa based on few specimens when discovery of additional specimens cannot reasonably be expected for some time.

Type locality.—The only known specimens, the holotype (GSCM 1693) and paratype (GSCM 1694), were collected from the Coon Creek Formation in Union County, Mississippi, in the NE¼, NW¼, SE¼, section 9, T. 8S., R. 4E. The holotype is deposited in the collection of the GSC Museum (Georgia Southern College, Statesboro, Georgia 30460-8161).

Etymology.—The trivial name "wadei" honors the stratigrapher and paleontologist, Bruce Wade, whose pioneering efforts built the foundation for subsequent studies of Cretaceous fossils of the Mississippi Embayment.

Remarks.—The specimens collected are phosphatic steinkerns (internal molds) that are grayish orange (10 YR 714) to yellowish gray (5 Y 712) in color. The carapaces are broken by compression and show two sizes (0.5 mm and 1.2 mm) of open burrows within them. The crabs' legs have been broken away by weathering but were partly replicated by dental impression wax for study. This is the typical mode of preservation at the Blue Springs locality.

The *Dakoticancer australis* Assemblage

The Blue Springs *Dakoticancer* Assemblage (Bishop 1983 fig. 3, table 1) consists of 11 decapods and is dominated by a few taxa (*D. australis* (49.0%), *Protocallianassa mortoni* (Pilsbry, 1901) (26.9%), and *Hoploparia tennesseensis* Rathbun, 1926 (10.1%)) and eight other taxa present in very small numbers (Bishop 1985). *Seorsus wadei* constitutes less than 0.1% of it. The assemblage is thought to represent a preserved community fraction (Bishop 1981) of a Cretaceous decapod-dominated community that periodically inhabited the Cretaceous sea bottom (Bishop 1986a).

The Superfamily Dakoticancroidea and Family Dakoticancridae were erected by Rathbun (1917:385) to contain the crab *Dakoticancer overanus* described from the Western Interior Cretaceous (South Dakota). In 1935 Rathbun described *D. overanus australis* and reassigned *Tetracarcinus subquadratus* to the Family Dakoticancridae. Glaessner (1960:46) remarked on similarities and reassigned *Avitelmessus grapsoideus* to Dakoticancridae. This classification is the currently accepted model (Glaessner 1969:R491). Bishop (1983:426) raised *D. overanus australis* to species level rank. Rathbun (1937:26) described *D. olssoni,* but it should be assigned to another genus. The current constitution of the Superfamily Dakoticancroidea is presented below with diagnoses and illustrations (Fig. 1).

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Fig. 1. North American Cretaceous dakoticancroid crabs. A–F, *Seorsus wadei,* n. sp.: A–D, Holotype (GSCM 1693) in dorsal, ventral, anterior, and left lateral views, ×2.0; E–F, Comparative dorsal views of Holotype and Paratype (GSCM 1694). G–M, Comparative views of other dakoticancroid taxa: G, *Tetracarcinus subquadratus* Weller, 1905, carapace (GAB 37-1113); K, Same, right claw, ×2.0; H, *Dakoticancer overanus* Rathbun, 1917, carapace (GAB 4-2006, ×1.5); L, Same, right claw (GAB 4-B4, ×2.0); I, *Dakoticancer australis* Rathbun, 1935, carapace (USNM 73840, ×1.5); M, Same, right claw (GAB 37-1094, ×2.0); J. *Avitelmessus grapsoideus* Rathbun, 1923, carapace (USNM 25411, ×2.5).

Superfamily Dakoticancroidea
Rathbun, 1917
nom. correct. Glaessner (1969, R491)
(pro Dakoticancroideae Rathbun, 1917)

Diagnosis.—"Carapace rectangular to transversely ovoid, front narrow; orbits well developed, median part of cardiac groove weak, branchiocardiac groove strong, no lineae; third maxillipeds elongate; sternum of female without longitudinal grooves, fifth pereiopods subdorsal, small." (Glaessner 1969:R491).

Family Dakoticancridae Rathbun, 1917

Diagnosis.—Characters of superfamily.

Genus *Dakoticancer* Rathbun, 1917

Diagnosis.—"Carapace rectangular to transversely ovoid, wider than long, front narrow, orbits well developed, bilobed; median part of cardiac groove weak, gastric regions hardly separated from cardiac-intestinal region, branchiocardiac groove well developed, pleural sutures on carapace sides; genital openings on coxae, female on third leg and male on fifth; fifth legs much reduced. Chelae equal." (Bishop 1983:424).

Dakoticancer overanus Rathbun, 1917
Fig. 1H, L

Diagnosis.—Carapace moderate size, slightly wider than long, widest across epibranchial regions, sides sinuous, slightly convergent posteriorly, well-differentiated by grooves, cervical groove prominent; ornamented by granules over areolations; posterior shelf narrow, rim upturned. Claws equal, much longer than high.

Dakoticancer australis Rathbun, 1935
Fig. 1I, M

Diagnosis.—"Carapace large, slightly longer than wide, widest across branchial and hepatic regions (sides nearly parallel), well differentiated by grooves, ornamented by granules over entire surface. Claws similar, equal, short, stout, and crested; carpal articulation very oblique; fingers short, downturned." (Bishop 1983:426).

non *Dakoticancer olssoni* Rathbun, 1937

Remarks.—Rathbun assigned this Cretaceous crab to *Dakoticancer* with no comparison. The specimen in question (USNM 495104) was examined by me on 26 Aug 1977 at which time I made the note, "This is *not* a *Dakoticancer.*" The specimen has probable affinity to the Necrocarcinids, possibly being assignable to *Protonecrocarcinus* Förster, 1968, or to *Cyphonotus* Bell, 1863.

Genus *Tetracarcinus* Weller, 1905
Tetracarcinus subquadratus Weller, 1905
Fig. 1G, K

Diagnosis.—Carapace small, subquadrate, widest across epibranchial region, length nearly equals width; sides sinuous; areolations low, granulate, cardiac region large; weakly differentiated by smooth grooves, particularly peripherally, on cephalic arch, and deeper on scapular arch. Claws equal, inflated proximally, fingers small.

Seorsus, new genus
Seorsus wadei, new species
Fig. 1A–F

Genus *Avitelmessus* Rathbun, 1923
Avitelmessus grapsoideus Rathbun, 1923
Fig. 1J

Diagnosis.—Carapace very large, flat, circular, widest at midlength anterolateral margin spinose. Grooves poorly developed except for those delimiting sagittal ridge and epimeral peninsula; sagittal ridge well-differentiated, epibranchial somewhat tumid, other regions not well-differentiated; regions relatively level, especially peripherally. Claws equal, short, crested, granulate; fingers large, downturned, fluted, and toothed.

Biogeography

Dakoticancroid crabs are confined to the latest Cretaceous rocks (Santonian-Maastrichtian) of North America on the shallow shelves of the Tethys Sea. The taxa are more or less endemic but with boundaries of their distributions somewhat overlapping. *Tetracarcinus subquadratus* is abundant on the Northern Atlantic Coastal Plain and in the Mississippi Embayment, with but one record in the Western Interior Seaway. *Avitelmessus grapsoideus* is found on the Southern Atlantic Coastal Plain and is abundant in the Mississippi Embayment where it occurs in the dominant *Avitelmessus* Assemblage in thin layers over large areas. The unusually large size of this crab, its abundance, and its occurrence in laminated shales and calcareous sandstones are correlated with yet undefined environmental conditions. *Dakoticancer australis* is the predominant decapod in the *D. australis* Assemblage of Northern Mississippi (Bishop 1983), and *Seorsus wadei* is a minor element in it. *Dakoticancer overanus* is the predominant decapod in the repeated *D. overanus* Assemblages of the middle Western Interior Seaway (Bishop 1981). Little has been substantiated about evolutionary development of the dakoticancroid crabs. It is apparent, however, that *Tetracarcinus* is the oldest known dakoticancroid, with abundant Santonian–Campanian records on the Northern Atlantic Coastal Plain, and that *Dakoticancer* probably evolved from *Tetracarcinus* and migrated into the Western Interior during the Late Campanian and into the Mississippi Embayment during the Maastrichtian (Bishop 1986b:129).

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